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ARS 870 (2012) (English): Lentils --
Specification



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Lentils — Specification



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Introduction

Lentils play a major role in food and nutritional security because of the high protein content of their seed. As is the case for many pulses, lentils play an important role as a rotation crop, enhancing soil fertility and providing other environmental services in production systems. Among lentil-producing developing countries, policies have not yet focused on lentil development needs to enhance food security and provide a remunerative rotation crop for cereals. Looking towards a future in which there is likely to be less water available to agriculture, climate change, food insecurity, rising costs for inorganic nitrogen fertilizer, and an increasingly nutrition-conscious society—collectively these give a bright future for a highly nutritious food produced by a nitrogen-fixing crop such as lentil adapted to the farming systems of marginal lands.

Draft African Standard for comments only — Not to be cited as African Standard

Lentils — Specification

1 Scope

This African Standard specifies the requirements and methods of sampling and test for shelled whole lentils of varieties (cultivars) grown from *Lens culinaris* Medic. Syn. *Lens esculenta* Moench. intended for human consumption.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ARS 53, *General principles of food hygiene — Code of practice*

ARS 56, *Prepackaged foods — Labelling*

CODEX STAN 193, *Codex general standard for contaminants and toxins in food and feed*

ISO 520, *Cereals and pulses — Determination of the mass of 1000 grains*

ISO 605, *Pulses — Determination of impurities, size, foreign odours, insects, and species and variety — Test methods*

ISO 2164, *Pulses — Determination of glycosidic hydrocyanic acid*

ISO 2171, *Cereals, pulses and by-products — Determination of ash yield by incineration*

ISO 4112, *Cereals and pulses — Guidance on measurement of the temperature of grain stored in bulk*

ISO 4174, *Cereals, oilseeds and pulses — Measurement of unit pressure loss in one-dimensional air flow through bulk grain*

ISO 5223, *Test sieves for cereals*

ISO 5527, *Cereals — Vocabulary*

ISO 6322-1, *Storage of cereals and pulses — Part 1: General recommendations for the keeping of cereals*

ISO 6322-2, *Storage of cereals and pulses — Part 2: Practical recommendations*

ISO 6322-3, *Storage of cereals and pulses — Part 3: Control of attack by pests*

ISO 6639-1, *Cereals and pulses — Determination of hidden insect infestation — Part 1: General principles*

ISO 6639-2, *Cereals and pulses — Determination of hidden insect infestation — Part 2: Sampling*

ISO 6639-3, *Cereals and pulses — Determination of hidden insect infestation — Part 3: Reference method*

ISO 6639-4, *Cereals and pulses — Determination of hidden insect infestation — Part 4: Rapid methods*

ISO 6888-1, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of coagulase-positive staphylococci (Staphylococcus aureus and other species) — Part 1: Technique using Baird-Parker agar medium*

ISO 6888-2, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of coagulase-positive staphylococci (Staphylococcus aureus and other species) — Part 2: Technique using rabbit plasma fibrinogen agar medium*

ISO 6888-3, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of coagulase-positive staphylococci (Staphylococcus aureus and other species) — Part 3: Detection and MPN technique for low numbers*

ISO 7251, *Microbiology of food and animal feeding stuffs — Horizontal method for the detection and enumeration of presumptive Escherichia coli — Most probable number technique*

ISO 13690, *Cereals, pulses and milled products — Sampling of static batches*

ISO 16002, *Stored cereal grains and pulses — Guidance on the detection of infestation by live invertebrates by trapping*

ISO 16050, *Foodstuffs — Determination of aflatoxin B₁, and the total content of aflatoxin B₁, B₂, G₁ and G₂ in cereals, nuts and derived products — High performance liquid chromatographic method*

ISO/TS 16634-2, *Food products — Determination of the total nitrogen content by combustion according to the Dumas principle and calculation of the crude protein content — Part 2: Cereals, pulses and milled cereal products*

ISO 20483, *Cereals and pulses — Determination of the nitrogen content and calculation of the crude protein content — Kjeldahl method*

ISO 21527-2, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of yeasts and moulds — Part 2: Colony count technique in products with water activity less than or equal to 0.95*

ISO 24557, *Pulses — Determination of moisture content — Air-oven method*

AOAC Official Method 2001.04, *Determination of Fumonisin B₁ and B₂ in corn and corn flakes — Liquid chromatography with immunoaffinity column cleanup*

3 Definitions

For the purpose of this standard the following definitions apply.

3.1

lentils

threshed seeds of the lentil plant (*Lens culinaris* Medic. Syn. *Lens esculenta* Moench),

3.2

peeled, split and broken

includes lentils which are otherwise sound but which are less than three-quarters of whole seeds or where less than one-half of the seed coat is intact. Lentils with cracked or clipped seed coats are considered sound when the cotyledons are firmly held together.

3.3

damaged lentils

whole and pieces of lentils which are distinctly damaged by frost, weather, disease, heat (other than to a material extent), immature, or other causes, except weevil or material heat damage or are distinctly soiled or stained by nightshade, dirt, or toxic material or otherwise damaged in a way which materially affects quality.

NOTE Kernels that are deformed are considered sound unless there is another reason for the damage beyond the deformity.

3.4

defective lentils (total)

the categories of defective lentils shall be weevil damaged lentils, heat-damaged lentils, damaged lentils, and split lentils

3.5

foreign matter

any extraneous matter than lentils or other food grains comprising of

- (a) "inorganic matter" includes metallic pieces, shale, glass, dust, sand, gravel, stones, dirt, pebbles, lumps or earth, clay, mud and animal filth etc;
- (b) "organic matter" consisting of detached seed coats, straws, weeds and other inedible grains etc.

3.6

toxic, poisonous and/or harmful seeds

any seed which if present in quantities above permissible limit may have damaging or dangerous effect on health, organoleptic properties or technological performance such as Jimson weed — dhatura (*D. fastuosa* Linn and *D. stramonium* Linn.) corn cokle (*Agrostemma githago* L., *Machai Lallium remulenum* Linn.) Akra (*Vicia* species), *Argemone mexicana*, Khesari and other seeds that are commonly recognized as harmful to health

3.7

whole lentils

lentils with one-fourth or less of the cotyledons removed and with the remainder of the cotyledons firmly held together

3.8

immature lentils

lentils that do not have a traditional lens shaped profile due to immaturity. Immature lentils are characterized as having a thin or flat (wafer-like), wrinkled, and misshapen appearance. Lentils may also be discoloured.

4 Quality requirements

4.1 General requirements

Lentils shall meet the following general requirements/limits as determined using the relevant standards listed in Clause 2. Lentils;

- a) shall consist of mature dry seeds obtained from the plant botanically known as *Lens culinaris* Medic. Syn. *Lens esculenta* Moench.
- b) shall be clean, well-filled, wholesome, uniform in size, shape, colour and in sound merchantable conditions;
- c) shall be free from substances which render them unfit for human or animal consumption or processing into or utilisation thereof as food or feed;
- d) shall be free from abnormal flavours, musty, sour or other undesirable odour, obnoxious smell and discolouration;
- e) shall be free of pests, live animals, animal carcasses, animal droppings, fungus infestation, added colouring matter, moulds, impurities of plant and animal origin including insects, rodent hair and excreta and shall meet any other sanitary and phytosanitary requirements;

- f) shall be free from micro-organisms and substances originating from micro-organisms, fungi or other poisonous or deleterious substances in amounts that may constitute a hazard to human health.
- g) shall be free from toxic or noxious seeds that are commonly recognized as harmful to health;
- h) shall contain no chemical residues which exceed the prescribed maximum residue limit;
- i) shall contain not more than 10 microgram per kilogram aflatoxin of which not more than 5 microgram per kilogram may be aflatoxin B1.

4.2 Specific requirements

4.2.1 Grading

Lentils shall be graded into three grades on the basis of the tolerable limits established in Table 1 which shall be additional to the general requirements set out in this standard.

4.2.2 Ungraded lentils

Ungraded lentils shall be lentils which do not fall within the requirements of Grades 1, 2 and 3 of this standard but meet the minimum requirements provided in 4.1 and are not rejected lentils. Ungraded lentils can be sorted out to Grade 1, 2 or 3 in accordance with the relevant procedures.

4.2.3 Reject grade lentils

Reject lentils shall be peas which are musty, sour, heating, materially weathered, or weevily; which have any commercially objectionable odour; which contain insect webbing or filth, animal filth, any unknown foreign substance, broken glass, or metal fragments; or which are otherwise of distinctly low quality. The characteristics are not within the parameters specified in Table 1. They cannot satisfy the conditions of under grade lentils and shall be graded as reject lentils and shall be regarded as unfit for human or animal consumption.

Table 1 — Specific requirements

Characteristics	Maximum limits			Method of test
	Grade 1	Grade 2	Grade 3	
Foreign matter, % m/m	0.2	0.5	1	ISO 605
Inorganic matter, % m/m	0.1	0.2	0.5	
Broken/split grains, % m/m	2	3.5	5	
Pest damaged grains, % m/m	0.3	0.5	0.6	
Rotten & Diseased grains, % m/m	0.2	0.5	0.5	
Discolored grains, % m/m	1	2	3	
Immature/Shriveled grains, % m/m	1	2	5	
Filth, % m/m	0.1	0.1	0.1	
Total Defective Grains, % m/m	2	3.5	5	
Moisture, % m/m	13.0	13.0	13.0	ISO 24557
Total Aflatoxin (AFB1+AFB2+AFG1 +AFG2)), ppb	10			ISO 16050
Aflatoxin B1 only, ppb	5			
Fumonisin ppm	2			AOAC 2001.04

5 Contaminants

5.1 Heavy metals

Lentils shall comply with those maximum limits for heavy metals established by the Codex Alimentarius Commission for this commodity.

5.2 Pesticide residues

Lentils shall comply with those maximum pesticide residue limits established by the Codex Alimentarius Commission for this commodity.

5.3 Mycotoxin limits

Lentils shall comply with those maximum mycotoxin limits established by the Codex Alimentarius Commission for this commodity. In particular, total aflatoxin levels in lentils intended for human consumption shall not exceed 10 µg/kg (ppb) with B₁ not exceeding 5 µg/kg (ppb) when tested according to ISO 16050.

6 Hygiene

6.1 Lentils shall be produced, prepared and handled in accordance with the provisions of appropriate sections of ARS 53.

6.2 When tested by appropriate standards of sampling and examination listed in Clause 2, the products:

- shall be free from microorganisms in amounts which may represent a hazard to health and shall not exceed the limits stipulated in Table 2;
- shall be free from parasites which may represent a hazard to health; and
- shall not contain any substance originating from microorganisms in amounts which may represent a hazard to health.

Table 2 — Microbiological limits

	Type of micro-organism	Limits	Test method
i)	Yeasts and moulds, max. per g	10 ⁵	ISO 21527-2
ii)	<i>Staphylococcus aureus</i> per 25 g	Not detectable	ISO 6888
iii)	<i>E. Coli</i> , max. per g	Not detectable	ISO 7251
iv)	<i>Salmonella</i> , max. per 25 g	Not detectable	ISO 6579

7 Packaging

7.1 Lentils shall be packed in suitable packages which shall be clean, sound, free from insect, fungal infestation and the packing material shall be of food grade quality.

7.2 Lentils shall be packed in containers which will safeguard the hygienic, nutritional, technological and organoleptic qualities of the products.

7.3 The containers, including packaging material, shall be made of substances which are safe and suitable for their intended use. They shall not impart any toxic substance or undesirable odour or flavour to the product.

7.4 Each package shall contain lentils of the same type and of the same grade designation.

7.5 If lentils are presented in bags, the bags shall also be free of pests and contaminants.

7.6 Each package shall be securely closed and sealed.

8 Labelling

In addition to the requirements in ARS 56, each package shall be legibly and indelibly marked with the following:

- i) product name as “Lentils”;
- ii) variety and / or colour;
- iii) grade;
- iv) name, address and physical location of the producer/ packer/importer;
- v) lot/batch/code number;
- vi) net weight, in kg;
- vii) the declaration “Food for Human Consumption”
- viii) storage instruction as “Store in a cool dry place away from any contaminants”;
- ix) crop year;
- x) packing date;
- xi) instructions on disposal of used package;
- xii) country of origin;
- xiii) a declaration on whether the lentils were genetically modified or not.

8.2 Labelling of non-retail containers

Information for non-retail containers shall either be given on the container or in accompanying documents, except that the name of the product, lot identification and the name and address of the manufacturer or packer shall appear on the container. However, lot identification and the name and address of the manufacturer or packer may be replaced by an identification mark, provided that such a mark is clearly identifiable with the accompanying documents.

9 Sampling methods

Sampling shall be done in accordance with the ISO 13690.

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EAS 760:2011, *Lentils — Specification*

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Lentils, Official Grain Grading Guide, August 1, 2012, Canadian Grain Commission

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